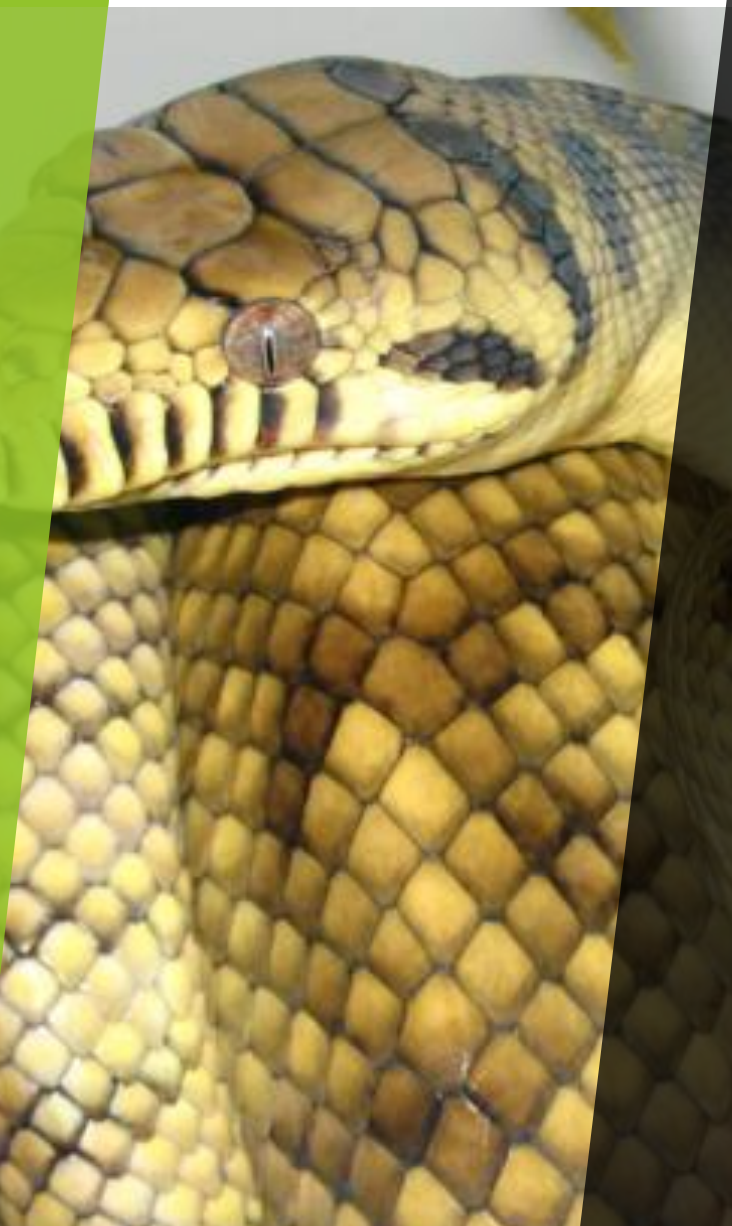
python

Introduction to Python



Where did Python get its name from?

WRONG?!?

On the origins of Python, Guido Van Rossum wrote in 1996:

> “...In December 1989, I was looking for a "hobby" programming project that would keep me occupied during the week around Christmas. My office ... would be closed, but I had a home computer, and not much else on my hands. I decided to write an interpreter for the new scripting language I had been thinking about lately: a descendant of ABC that would appeal to UNIX / C hackers. I chose Python as a working title for the project, being in a slightly irreverent mood (and a big fan of *Monty Python's Flying Circus*). ”

Features of Python

Python is Easy

- Python is one of the easiest language to get started with.
- Programs written in Python look similar to English sentences.
- Because of it's simplicity, most entry level programming courses uses Python to introduce programming concepts to their students.
- Very popular programming language in first year university currently

Python is Portable/Platform Independent

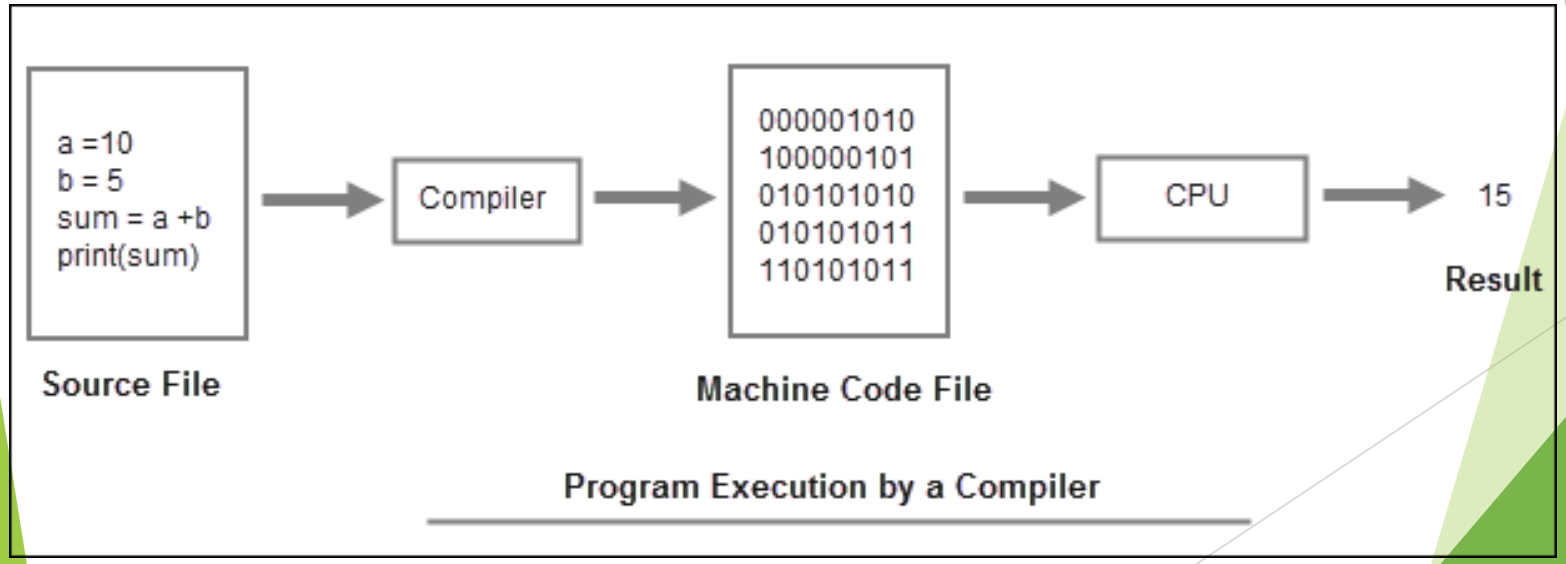
- Python is portable which means we can run Python programs in various different operating system without any changes.

Compiled vs Interpreted Languages

- Python is an interpreted language
- C, C++ are examples of compiled languages
- Programs written in a high level language are called source code or source program and the commands in the source code are called statements.
- A computer can't execute a program written in high level language, it only understands machine language which consists of 0s and 1s only (known as binary)
- There are two types of programs available to us to translate high-level language to machine language: Compiler and the Interpreter

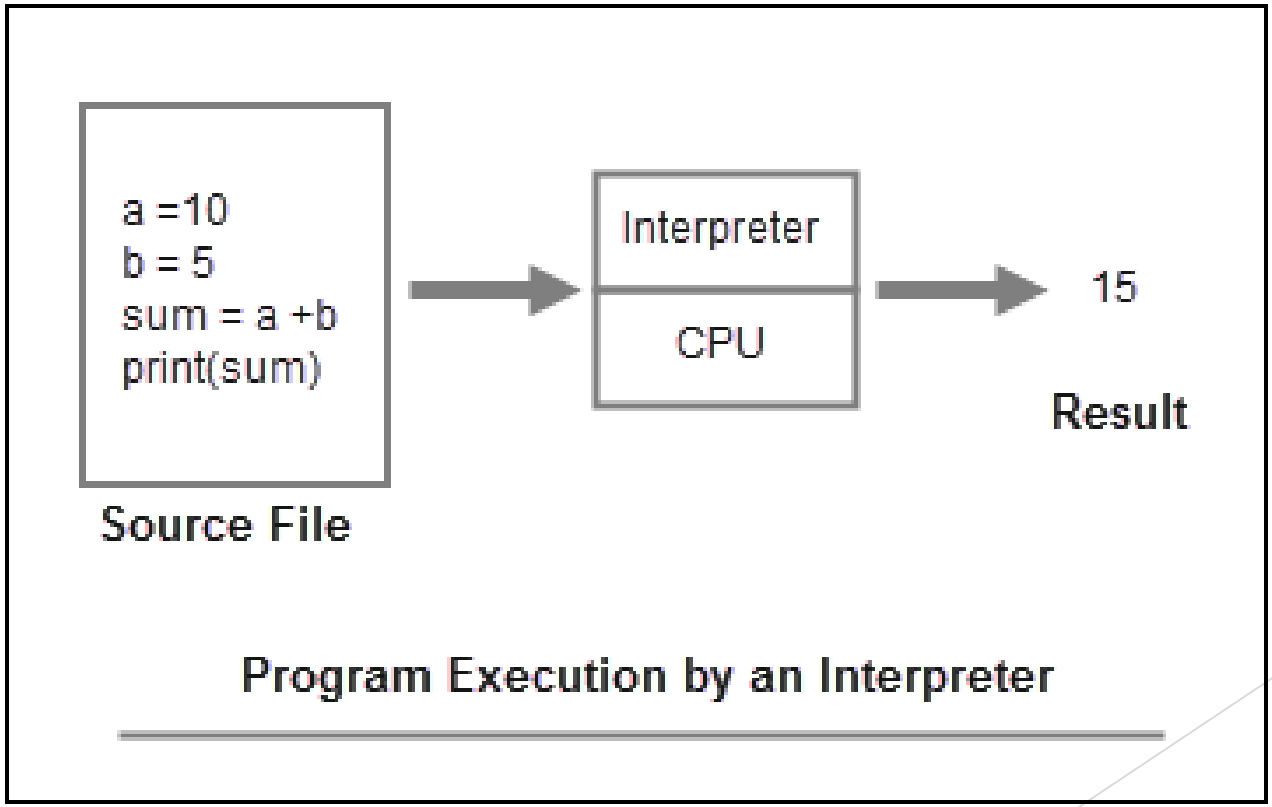
Compiler

A compiler translates the entire source code into machine language in one go, the machine language is then executed.



Interpreter

An interpreter on the other hand, translates high-level language into machine language line by line, which it then executes. Python Interpreter starts at the top of the file, translates the first line into machine language and then executes it. This process keeps repeating until the end of the file is reached.



Strongly Typed Language

Strongly typed languages don't convert data from one type to another type automatically. Languages like JavaScript and PHP, are called loosely typed languages because they convert data from one type to another type freely.

Consider the following JavaScript code:

```
1 price = 12
2 str = "The total price = " + 12
3 console.log(str)
```

Output:

```
1 The total price = 12
```

In this case, before adding 12 to the string; JavaScript first converts number 12 to string "12" and then appends it to the end of the string.

However, In Python statements like str = "The total price = " + 12 would produce an error because Python doesn't automatically converts number 12 to string.

Libraries

- Python has a huge set of libraries which makes it easy to add new capabilities without reinventing the wheel. We can access these libraries at https://pypi.python.org/pypi.

Types of applications you can build using Python

- Web applications
- Android applications
- GUI applications
- Games
- Scientific applications
- System administration applications
- Console applications

Who uses Python?

- Dropbox
- Disqus
- Reddit
- Quora
- Mozilla
- Google
- YouTube

Python Programming Environment

A set of tools that includes:

- An editor for entering and changing the program
- A compiler for translating programs into a machine language that the computer can understand.
- A debugger for locating and fixing errors

Starting Python – IDLE Mode

- IDLE stands for **I**ntegrated **D**eve**L**opment **E**nvironment
- In the application list, select "Python 2.7.6 GUI"
- This will start Python in "IDLE" mode – Here you tell python what to do and it does it immediately. You can see the results right away

Script Mode

- For this course will be programming in script mode so we can create programs that we can save and run later.
- Select “File” – “New File”
- A script mode window is opened ready for you to program
- Here, you can write, edit, load, and save your programs

Instructions in Python

- print (“Game Over”)
- ‘print’ - is the command – it does something
- A command in Python will be in bold
- “Game Over” - is an expression – it is something
- print (“Game Over”) is a statement
- In programming a statement is a complete instruction

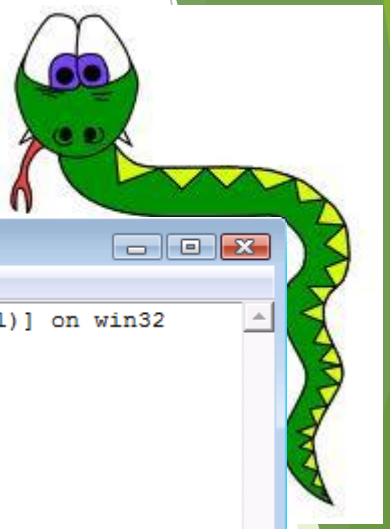
Saving and running a program

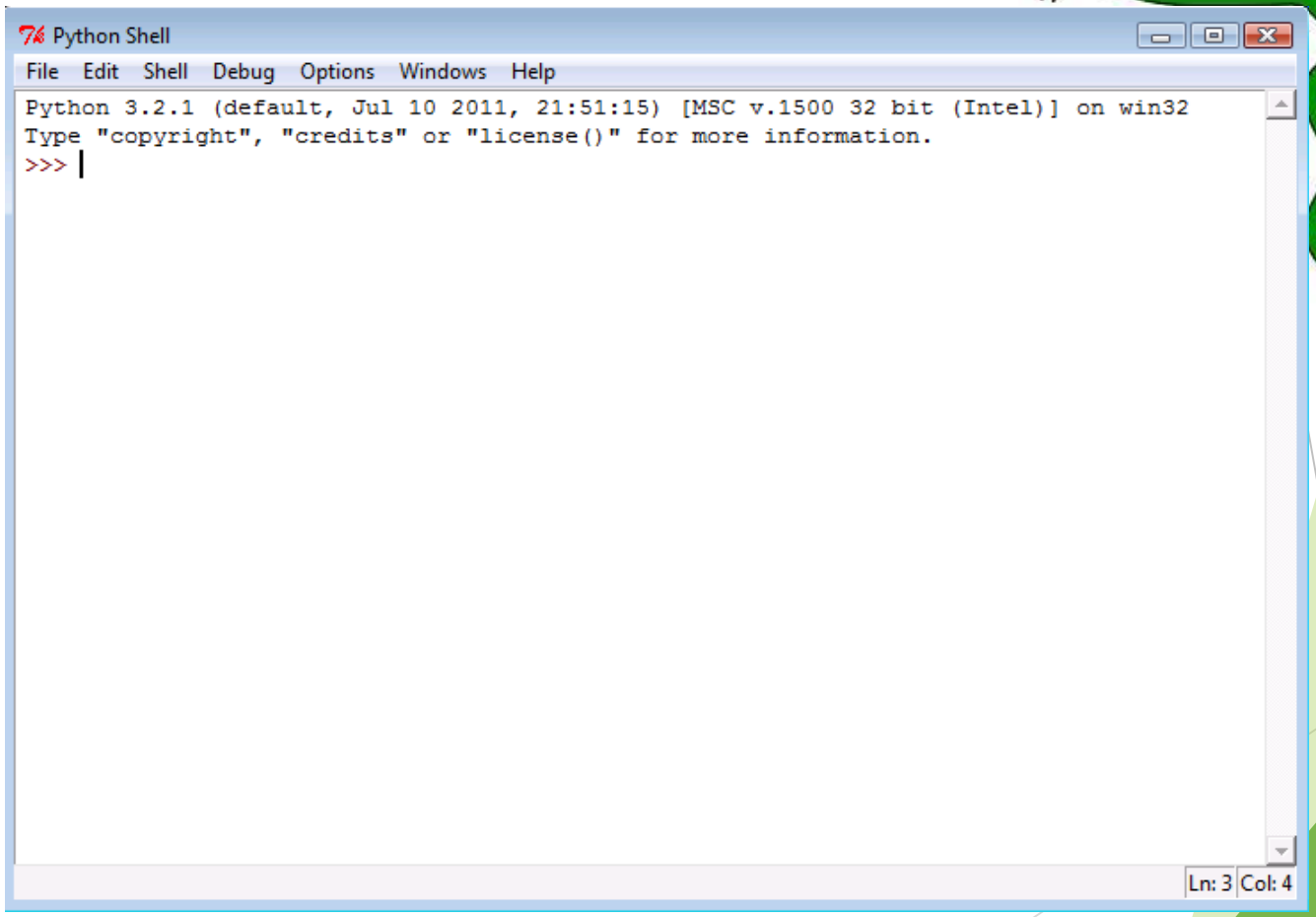
From Script mode:

1. To save your program
   - Select File, Save As.
   - Be sure to save your program using the extension .py
2. To run a program
   - Select Run, Run Module

- Once run, Python will execute each line in order from top to bottom and output the results in the IDLE

The Python Window



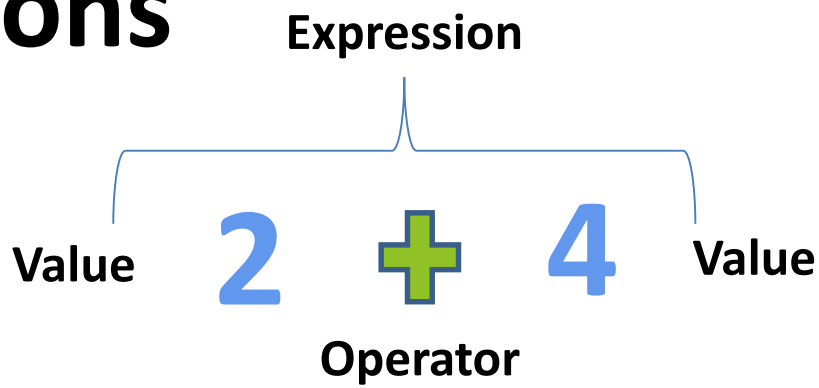


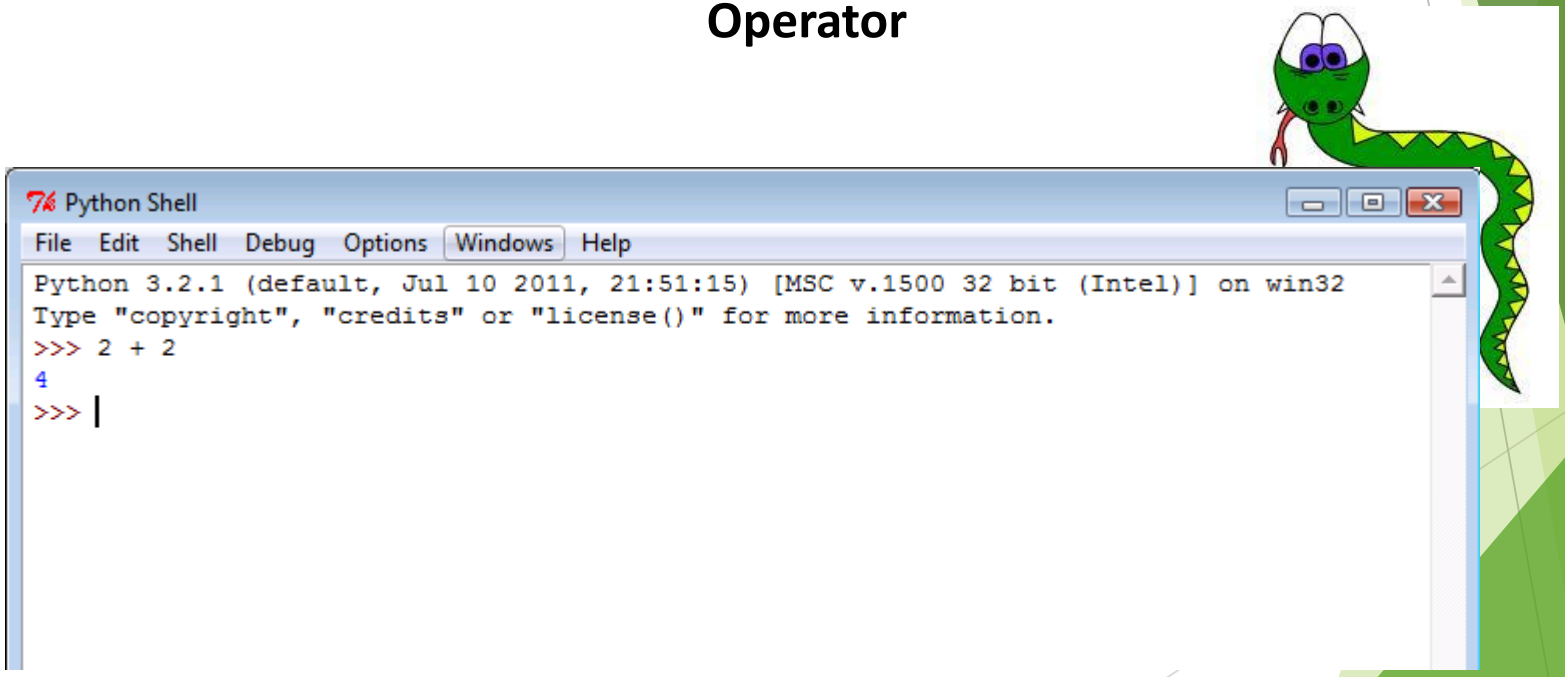
The Python Operators

When we use numbers in Python normal mathematical operators apply. Below are a list of the most used operators.

command	name	example	output
+	Addition	4+5	9
-	Subtraction	8-5	3
*	Multiplication	4*5	20
/	Division	19/3	6
%	Remainder	19%3	5
**	Exponent	2**4	16

Expressions





Statements

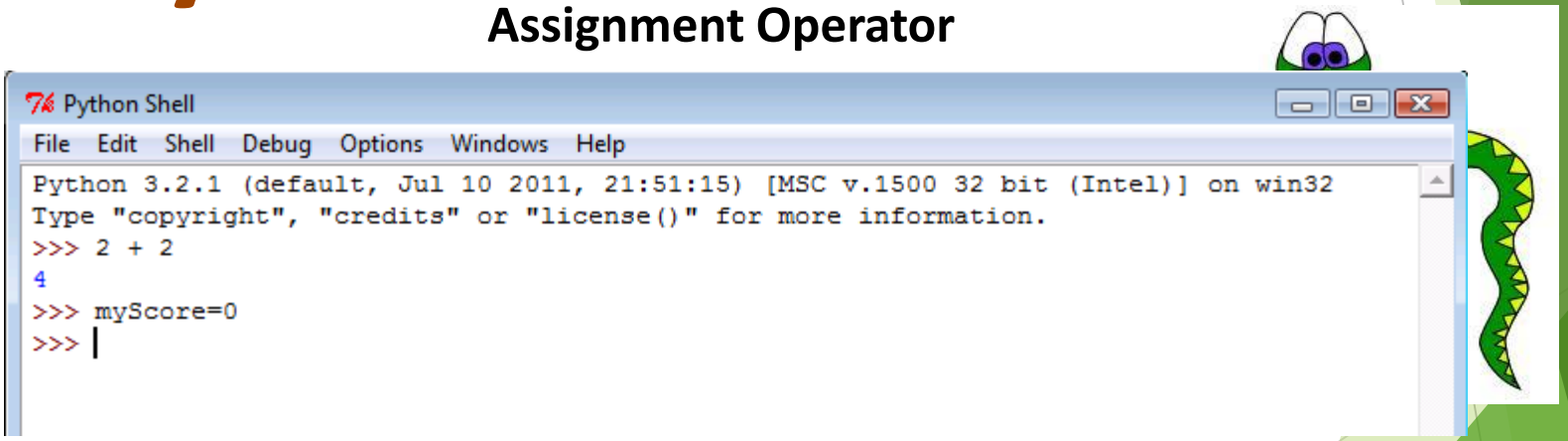
An assignment statement is when we assign a value to a variable. This is often referred to declaring variables.

Variable name

Value assigned

myScore = **0**

Assignment Operator

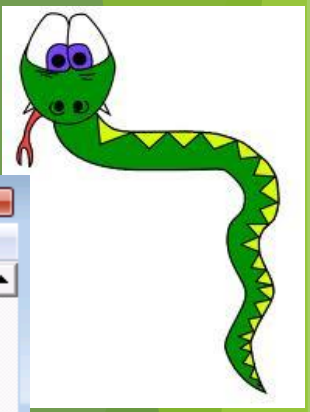


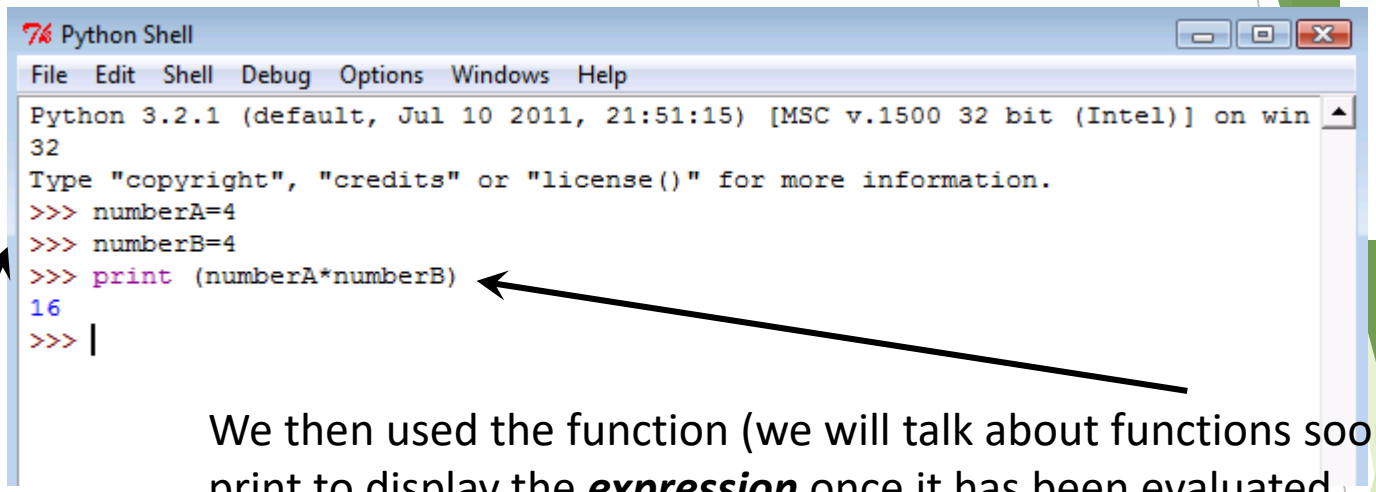
When we type in a ***variable*** and press return nothing appears to happen – however the ***value assigned*** to the variable has been stored ready to be used.

Data Types

Data Type	Description	Example
Integers	Whole Numbers	4, 0 and 99
Floating point numbers	Numbers with a decimal place	4.0, 5.6 and 9.9
String	Text	hello

Evaluating an Expression





We then used the function (we will talk about functions soon) print to display the ***expression*** once it has been evaluated.

Print (numberA * numberB)

In the example above we have assigned two variables a number

- Variable numberA has been assigned the value 4
- Variable numberB has been assigned the value 4